

Rusot: *an ancient Eastern Medicine.*—By DAVID HOOPER.

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Among some collections of Grecian antiquities exhibited in the British Museum and at Paris are certain small vases bearing the legend LYKION. That in the British Museum is a small vase made of lead, of a sub-ovoid form, about one inch in height, and about three-quarters of an inch in breadth. The inscription is in Greek letters and may be rendered the *Lycium of Museus*. In Paris there is a similar small vessel made of pottery-ware bearing on its side in Greek an inscription which may be translated *Lycium of Heracleus*. In 1814 M. Millin of Paris, published an account of a similar vase found at Tarentum, formerly a well-known Greek settlement. This vase is slightly larger than either of the others; it is made of clay, and has an inscription, *Lycium of Jason*. Two years later M. Tochon of Paris, gave an account of another vase not improbably from Tarentum, of the same material and size, and presenting the same inscription.

Figures of these four vessels were published by Dr. J. Y. Simpson, of Edinburgh, in an interesting paper entitled "Notes on some Ancient Greek Vases containing Lycium" [See *Monthly Journal of Medical Society (Edin.)*. XVI. (1853), 24; also *Pharm. Journ.* XIII. (1854), 413.]

These vases are intended to contain one and the same substance as shown by the indelible labels which they bear. The medicinal substance called Lycium or Lykion was a drug, which enjoyed much favour among the ancients and was supposed to be possessed of great virtue as a collyrium. The early Greek and Arabian writers describe its properties. Dioscorides recommends it as an astringent for the cure of various complaints affecting the eye. Galen, Oribasius, Paulus Ægineta, Scribonius Largus and Avicenna dilate upon the medicinal uses of Lycium as of value in many diseases besides ophthalmia.

Two varieties of Lycium were in use among the Greeks, one obtained from Lycia and Cappadocia, and the other from India. In the opinion of Paulus Aegineta (Adam's Translation, vol. III., p. 234) and

Galen (*De Simp. Medicam.* lib. VII., 64) the latter was regarded as by far the most valuable and powerful for all purposes. Avicenna (*Canon Medicinæ*, lib. II. cap. 398) gives a long account of the medical uses of Lykion and remarks, "Magis vincens, secundum existimationem, est quod Indicum est," and he compares its properties with a specimen from Mecca. Scribonius Largus, the reputed house-physician of the Emperor Claudius, and Marcellus laud its powers, the former declared that he attributed to no collyrium whatever, such great efficacy as to the genuine Indian Lycium used by itself.

Dr. J. Forbes Royle in a paper read before the Linnean Society of London in 1833¹ was the first to prove that the Indian Lycium is the same as Rusot, an inspissated extract prepared from the wood and roots of several species of Berberis. Dr. Royle, on inquiring in the shops of druggists in the bazars of India, learned that both the wood (*dar-huld*) and the extract, Rusot, were imported from the hills into the plains and that large quantities continued to be brought from Naggarkot as well as other places. He found that Rusot was procurable in every bazar in India, and was used by native practitioners who are fond of applying it both in incipient and chronic inflammation of the eye, it was used both simply and in combination with opium and alum.

It should be understood that in early times everything to which the adjective *Indicum* appertained was not necessarily derived from Hindustan; but with regard to Lycium or Rusot it is clear that the drug was a product of the peninsula. The authors of the *Pharmacographia* say, "The author of the Periplus of the Erythrean Sea who probably lived in the 1st century, enumerates *λδκιον* as one of the exports of Barbarike at the mouth of the Indus, and also names it along with Bdelium and Costus among the commodities brought to Barygaza: and further, lycium is mentioned among the Indian drugs on which duty was levied at the Roman custom house of Alexandria about A.D. 176-180.²

The nomenclature of the drug further confirms its Indian origin as it is interesting to find that two of the names for *Lycium* given by Ibn Baytar in the 13th century are precisely those under which Rusot is met with in the Indian bazars at the present day.

The names by which the extract of Barberry is known in the trade and profession in the country are Rusot, Rusivat, Raswanti, Rusvat, Rusout, from the Sanskrit Rasanjana; in Sinde it is Ruswal; in Persia,

¹ *Trans. Lin. Soc.*, XVII., p. 87.

² *Vincent, Commerce and Navigation of the Ancients in the Indian Ocean*, ii, (1807) 390, 410, 734.

Fil-zahrah or Pil-zahrah; in Arabic, Huziz or Hooshish; and in West Afghanistan, Ibrán.

In Hindu Materia Medica the root and extract are regarded as alterative and deobstruent, and are used in skin diseases, menorrhagia, diarrhoea and jaundice, but above all they have the greatest reputation in affections of the eye, mixed with opium, alum or rock-salt.

Dr. Wise, the author of "Commentaries on the Hindu System of Medicine," and Dr. Walker, of the Edinburgh Eye Dispensary, tried the preparation of Rusot with some measure of success in ophthalmia, but the opinion of Europeans is best summed up by Sir W. B. O'Shaughnessy in the following words:—"Rusout is best given as a febrifuge in half drachm doses, diffused through water, and repeated thrice daily or even more frequently. It occasions a feeling of agreeable warmth at the epigastrium, increases appetite, promotes digestion and acts as a very gentle but certain aperient. The skin is invariably moist during its operation."

Surgeon General W. R. Cornish reported that the Nilgiri Barberry had been used in the treatment of ague with good results, and coffee planters in the Wynaad, among others, have used it as a febrifuge. Preparations of barberry are still favourably employed by the medical profession in India, and a tincture of the root bark is often recommended in the treatment of fever.

The dried stem of *Berberis aristata* has recently been introduced into the Indian and Colonial Addendum to the British Pharmacopœia, and a liquid extract and tincture have been prescribed as desirable preparations for administering the drug.

Barberry wood and root were formerly used as a dye and pigment and among the Pahari or hill tribes the powdered wood is still smeared on the face to form caste-marks. According to the vernacular names employed in India these products were sometimes confounded with turmeric, and in some works it is stated that the properties of Barberry are similar to those of turmeric. It is known that the tree was formerly in use in Astrachan and Poland in Russia as a dye for leather, and in Germany it was used for staining wood. Dr. Royle in a letter addressed to the Agri-Horticultural Society of India, in 1838, informed the Secretary that the wood and root were in great demand in Europe and the supply in the South of Europe had failed. Samples from Ceylon had been tried and they were pronounced to be superior to any in the market. He finally suggested that the extract made in the hills of India and sold in the bazars as Rusot might be tried as a dye. It was said that it could readily be obtained for 4*d.* to 6*d.* the pound by proper arrangements in the district where the bushes are found

In Bombay the price is Rs. 8 to 9 per maund of $37\frac{1}{2}$ lb. In Madras the wholesale price is Rs. 35 per maund, and retails in the bazar at Rs. 2-4 per pound.

Dr. E. Solly further contributed a paper on "The Yellow Colour of Barberry and its use in the Arts" (*Journ. Roy. As. Soc.*, XIII (1844), also *Journ. Agri.-Horti. Soc. Ind.*, iii., 272). He reported that 17 per cent. of yellow colouring matter was obtainable from the roots, and suggested experiments being made in India to determine which part of the plant was richest in extract. According to Aitchison the extract is still used in West Afghanistan as a dyeing material.

Lest any hope should be entertained that Rusot might possess some commercial value as a dye-stuff, I would quote the opinion of an expert in the person of Mr. A. G. Perkin, of the Clothworkers Research Department, Leeds. In 1897, Mr. Perkin had occasion to examine the root of *Berberis Oetnensis* from Cyprus. He reported (*Journ. Chem. Soc.* LXXI. 1198), that the colouring matter was due to berberine of which he separated nearly one per cent. of the hydrochloride. Silk was dyed a yellow shade without the use of a mordant, but ordinary mordanted calico was not dyed owing to the basic nature of the colouring principle. He adds, "As a colouring matter, the use of berberine has been practically discontinued, so that the tinctorial properties of the root have but little commercial value."

The three species of Indian Barberry that are used in preparing the extract called Rusot are—

1. The Nepal Barberry (*Berberis aristata*, DC.), a variable species occurring in the temperate regions of the Himalaya at 6,000 to 10,000 feet elevation, also found in the Nilgiri Hills and Ceylon.

2. The Ophthalmic Barberry (*B. Lycium*, Royle,) an erect, rigid shrub found in dry hot situations of the western part of the Himalaya range at 3,000 feet above the sea level.

3. The Indian Barberry (*B. asiatica*, Roxb.). This species has a wider distribution than the last, being found in the dry valleys of Bhutan and Nepal whence it stretches westward along the Himalaya to Gharwhal, and occurs again in Afghanistan.

The extract is obtained by digesting in water slices of the bark, root and twigs for a few hours, then boiling, straining and evaporating to a soft consistence. Capt. H. W. Lowther describes in *Journal Agricultural Society of India*,¹ the preparation of the inspissated juice of *Berberis aristata* at Hawalbagh in Kumaon. The fresh roots of the Barberry were chopped into small pieces with a hatchet. About ten

¹ Vol. IX., (1857) p. 353.

pounds were placed in large *gurrak* which was filled up to the neck with water. It was boiled over a slow fire until one fourth of the liquid was evaporated, the liquor was again boiled with some fresh chips, and the process was repeated three times. The liquid was strained through a coarse cloth and the chips squeezed. The juice, on further heating, became concentrated to a thick fluid, which was poured out into trays and exposed to the full heat of the sun until it was sufficiently solid. The latter part of the process must be conducted carefully and thoroughly so as to prevent any tendency to mouldiness or fermentation in the finished extract. In the "Materia Medica of the Hindus," by U. C. Dutt, *Rasanjana*, as it is called in Sanskrit, is directed to be prepared by boiling together equal parts of a decoction of Indian Barberry and milk, till reduced to the consistence of an extract.

Rusot is a dark-brown extract of the consistence of opium having a bitter and astringent taste. It dissolves almost entirely in distilled water and partly in rectified spirit, forming a rich yellowish-brown solution which becomes bright yellow when diluted. The intense bitterness is due to the alkaloid berberine which pervades the root, bark, blossoms, berries and leaves of the plant.

Four samples of this preparation are exhibited in the Indian Museum—one from United Provinces, one from Bushahr, one from Hazara and the other from Lahore in the Panjab. These were examined as regards the amount of moisture, extractive matter, ash and alkaloid, berberine, they contained.

The sample from the United Provinces was prepared in 1893, and was a dark-brown extract with a shining fracture.

The second sample was forwarded to the Indian Museum by the Forest Ranger, of the Nogli and Pahor Ranges, Bushahr Division, Punjab, in April 1901. It was a soft extract prepared by boiling the chips of the root of *Berberis Lycium*, a shrub locally called "Chochar." In this division an extract is also made from the roots of *B. aristata*, a plant known in this district as "Kashmal."

The third sample was from the Deputy Conservator of Forests, Hazara Division, Panjab, who forwarded it to the Indian Museum in January 1902. This was a blackish brittle extract having the odour of liquorice. It occurred in square packets enveloped in leaves.

The fourth sample was from Lahore. It consisted of triangular cakes about one inch thick and three inches along the side, and each enveloped in the green leaves of *Bauhinia Vahlia*. The extract was of the consistence of opium, dark-brown in colour, and not always homogeneous in the interior.

The berberine was estimated by making an alcoholic extract of

the rusot, evaporating to a low bulk with an excess of hydrochloric acid, and separating and drying the crystals of berberine hydrochloride. A more accurate method was tried with the last sample. This is the process of A. M. Gordin (*Proc. Amer. Pharm. Ass.*, vol. 50, (1902), 1051), which consists in separating the alkaloid in the form of crystalline berberine-acetone, drying and weighing the compound, and calculating 85·24 per cent of these crystals as pure berberine.

The following are the results of the examination:—

	1	2	3	4
	United Provinces.	Bushahr.	Hazara.	Lahore.
Water ...	6·70	40·31	4·00	20·98
Spirit extract ...	25·85	27·15	38·25	40·16
Water extract ...	36·25	17·43	29·32	20·85
Fibre ...	15·50	10·00	19·23	7·65
Ash ...	15·70	5·11	9·20	10·36
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	100·00	100·00	100·00	100·00
Berberine ...	7·75	2·9	3·46	4·22

The results indicate a variable amount of berberine in the samples of rusot manufactured in different districts, the amount ranging from 7·75 per cent. in that from the United Provinces to 2·90 per cent. in that from Bushahr. There is likewise little uniformity in the amount of extracts, insoluble material and ash, and the composition is found to differ very considerably in various portions of the same cake.

The alcoholic extract is the most valuable part of the drug, as it contains all the alkaloidal active principles; the aqueous extract, insoluble matter and ash may be regarded as impurities. Instead of the watery extract at present made in the jungles, and which varies so considerably in composition, a preparation made with alcohol would have many advantages, as it would be more concentrated and uniform, and could be readily standardized in regard to the alkaloidal strength measured as berberine.

